

# DECENTRALIZED CROWD FUNDING APPLICATION USING EHTEREUM BLOCKCHAIN.

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**Abstract:** Crowdfunding is the use of small amount of capital from a large number of individuals that provides funding to a business venture, for an entrepreneurship or for any social as well as medical causes. Crowdfunding is already a rage in the western countries and is now gaining immense popularity in India. In our project we propose a paradigm for developing crowdfunding using a decentralized Ethereum blockchain. The project caters us with the functionalities of a primitive level crowdfunding platform coupled with the potential advantages of blockchain technology.

**Keywords – Crowdfunding, Blockchain, Donations, Transparency.**

## 1 INTRODUCTION

Crowdfunding is the practice where in a crowd of people invest meagre amounts which would culminate to a large amount of capital to fund for a particular cause or sponsor a specific venture. Crowdfunding makes use of networking through social media platforms like Facebook, Telegram, Instagram, Twitter and other crowdfunding websites to attract a huge and diverse crowd of entrepreneurs, investors and common folk who aspire to serve, contribute and invest in a particular campaign. The person or organization who initiates a cause(campaign) or the entity who is in need of certain amount of funds is termed as a campaigner. Apart from the campaigner's relatives, friends and immediate family members, crowdfunding provides a wider reach and an easier access to people across the globe to donate. Many crowdfunding projects give out rewards in terms of monetary gains or finished products. Contributors may get to participate in the release or successful deployment of a new product or receive a valuable return for their investment. For instance, the maker of an innovative watch may decide to gift free samples to a limited group of investors. The donors of the campaign may receive a certain percentage of the total campaign amount provided that the campaign is successful.

Gamers invest in new video games and obtain a copy of the new releases. In the present scenario Kickstarter is one of the most popular and notable crowdfunding platforms present till date: since its inception in 2009, more than 135,000 projects have been successfully funded on the crowdfunding site, with more than \$3.5 billion dollars pledged across all Kickstarter projects. Indiegogo started as a crowdfunding site initially focused exclusively on raising money for independent films, but began accepting projects from any category a year after its launch in 2007.

### 1.1 PROBLEMS IN EXISTING SYSTEM

There are innumerable successful platforms like Milaap, Ketto, Indigogo etc. which have provided an innovative technique to collect funds. But these companies require users to trust the third party and furthermore there is no clear transparency and the cost of these services are quite high. One of the root problems of the conventional crowdfunding platforms is their dependencies on third party and lack of transparency in their transactions. With the help Blockchain Technology, we aim to eliminate the need of a third untrusted party by providing immutable transactions. The project highly focuses on providing transparency. The problem with the established crowdfunding companies is that they are centralized bodies, charging high fees and also influencing the projects. Crowdfunding based on Blockchain Technology is set to be a game changer because as it will decentralize the funding model from the likes of Kickstarter and other companies as well as lower additional costs.

## 2 BLOCKCHAIN: AN OVERVIEW

Blockchain Technology has been invented by Satoshi Nakamoto in 2008 aiming to serve as the public transaction ledger of the cryptocurrency bitcoin. Thus, the invention of the blockchain made it the first digital platform for many cryptocurrencies. Blockchain successfully solves the double-spending problem without the need for a trusted authority or central server. To define, a Blockchain is a growing list of records, known as blocks, which are linked using cryptography. Each of these blocks consists of a cryptographic hash value of the previous block, along with the timestamp, and transaction data. The most incontrovertible and astonishing fact about blockchain is that It's an open, distributed ledger which records the transactions between two parties in an efficient, verifiable and permanent manner ". For usage purpose, the blockchain is typically managed by a peer-to-peer network which collectively adheres to a protocol used for inter-node communication and validating new blocks. Once recorded and added to the network, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks, which requires a consensus of all the active nodes in the network. Although blockchain records seem to be unalterable, blockchains may be considered secure by design and exemplify a distributed computing system with high Byzantine fault tolerance.

### 2.1 Structure of Blockchain

A blockchain database is managed autonomously using a peer-to-peer network and a distributed timestamping server. They are authenticated by mass collaboration powered by collective self-interests. The result is a robust workflow where participants uncertainty regarding data security is marginal. The use of a blockchain removes the characteristic of infinite reproducibility from a digital asset. Blockchains have been described as a value-exchange protocol. This blockchain-based exchange of value can be completed quicker, safer and cheaper than with traditional systems.

### 2.2 Types Of Blockchain

- 1.Public Blockchain
- 2.Private Blockchain
- 3.Consortium Blockchain

### 2.3 Uses

Blockchain technology can be integrated into multiple areas. The primary use of blockchains today is as a distributed ledger for cryptocurrencies.

- 1.Cryptocurrency: Cryptocurrencies are the most popular and widely used application of blockchain. Cryptocurrencies like Bitcoin, Ether, Ripple and so on are used presently in market as virtual currencies.
- 2.Smart contracts: Smart contracts are basically functions which execute a set of commands and are responsible for carrying out transactions in the blockchain respectively. They are mostly used in developing dApps(decentralized applications).
- 3.Banks: Banks are interested in this technology with the primary focus being speeding up of back office settlement systems. UBS are opening new research labs to implement blockchain technology in order to explore how blockchain can be used in financial services to increase efficiency and reduce costs.
- 4.Supply Chain Management Systems: Blockchains are used in ERP's and supply chains since it offers an advanced level of transparency in transactions.

## 3. PROPOSED SYSTEM

The proposed system has all the functionalities of a standard crowd funding platform. The proposed system will be deployed on the Ethereum blockchain test network. Following are the modules which will be implemented.

### 3.1 Creating Campaign

A campaign is created by deploying the campaign on the RinkeBy test network. The campaign is deployed only if it is validated by the nodes present in the network. The nodes authenticate the campaign by using Proof of Work Consensus Algorithm. In proof of work algorithm, a particular transaction is approved only when the hash value of input is less than the difficulty level set by the algorithm. After creating a campaign, the user can view the particular details of the campaign by clicking on its public address.

### 3.2 Writing about the purpose of the campaign.

The admin will write about the details of the campaigner. The page includes text boxes titled First Name and Last Name. The admin will also mention the crypto currency target which is to be achieved. The target is titled as Minimum Contribution. The campaign will also include details of the campaigner's story. The story is a summary of the campaigner's purpose for the campaign. The story will explicitly narrate the motto of the campaign. Example: If the campaign is created to provide medical aid to a beneficiary through crowdfunding, the story will clearly state the disease the patient is suffering.

### 3.3 Accepting donations in the form of cryptocurrencies.

Donors/users who are visiting the application can help the beneficiary through the medium of crowd funding by donating money in the form of crypto currency. The crypto currency used by the application is ether. The donor can read the target amount required for the campaign and can make donation above the minimum amount set by the admin.

### 3.4 Campaign Success/Refund

If the donations in the form of crypto currency reach the mini-target then the ethers are sent to the campaigner's account. In case the mini-target is not achieved then ethers are refunded to the donors respectively.

#### 3.4.1 Flowchart of the system

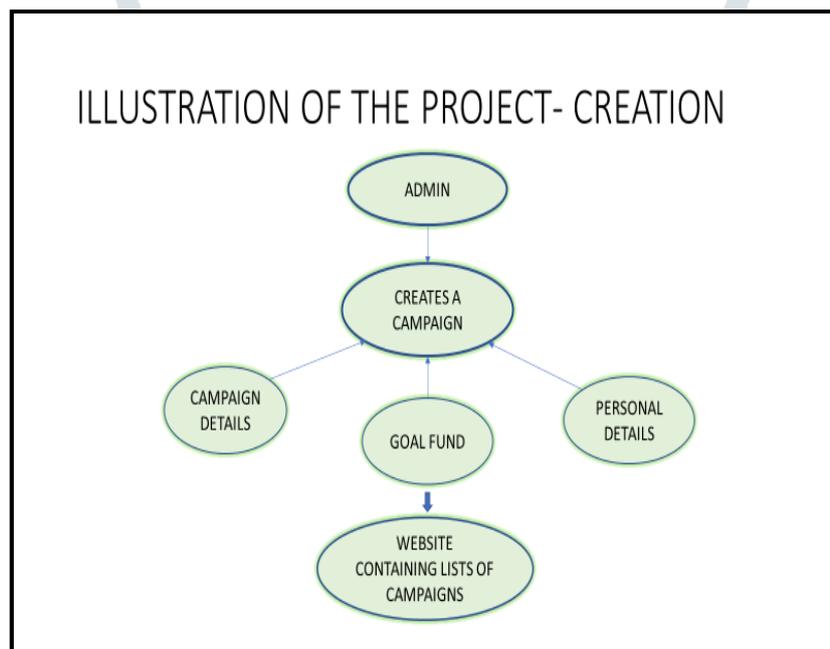


fig 1: flowchart of the system from Admin's view

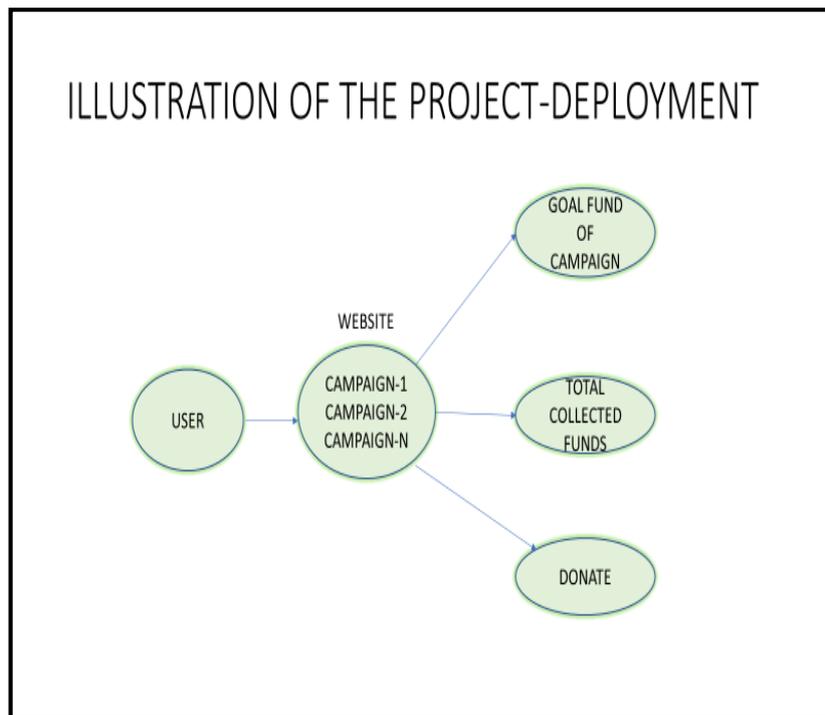


Fig 2: flowchart of the System from the user's view

## 4 ALGORITHMIC APPROACH

Blockchain is mainly based on the consensus algorithm. The consensus algorithm ensures that every block of transaction added in the chain or the network is verified and secured. It works on the principle of majority. Consensus algorithm is of many types but the two most popularly used are Proof-Of-Work and Proof-Of-State.

We have used Proof-Of-Work in our project. The process of generating correct proofs in order to add a block to the chain is known as mining and the nodes or computers participating in this process are called as miners. All these miners solve some complex cryptographic puzzles in order to add a block to the blockchain. The miners get rewarded in form of the respective crypto currencies on the platform they are working in. An important note to be considered is each block that is added in the blockchain must follow a certain set of consensus rules. In order to add the block, the miners must compete with all the other miners in order to find a correct hash for each hash function.

### 4.1 Design Considerations:

The following technologies and tools have been primarily used in the development of the system.

#### 4.1.1 MetaMask

MetaMask is a chrome plugin that allows you to enter the distributed system in your browser. It allows you to run Ethereum based decentralized applications directly in your browser without the need of a full Ethereum node. The MetaMask provides the user with a secure identity vault, which appears as a user interface to manage user's identities on different sites and sign the blockchain transaction. Ethereum based wallets are totally different from Bitcoin based wallets. So, we need a different approach to deal with an Ethereum. In, Ethereum wallets we look for the capability to store ETH (ethers) but we also look for the ERC20 support.

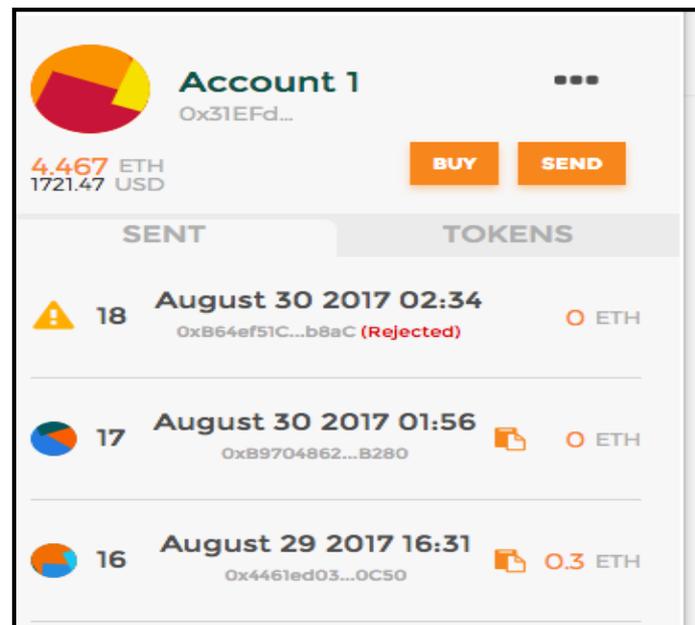


Fig 3: MetaMask Wallet

#### 4.2.2 REMIX IDE

Remix is a special integrated development environment designed for blockchains applications. It has an inbuilt solidity compiler with various releases available for selection. It has the functionality to deploy and debug the smart contracts.

Remix is a good solution if you intend to:

- Develop applications using smart contracts.
- Debug a smart contract's output.
- Access the validity of state and properties of already deployed smart contract.
- Debug already committed transaction.
- Analyze solidity code to reduce coding mistakes and to enforce best practices.
- Together with Mist (or any tool which inject web3), Remix can be used to test and debug a dApp.

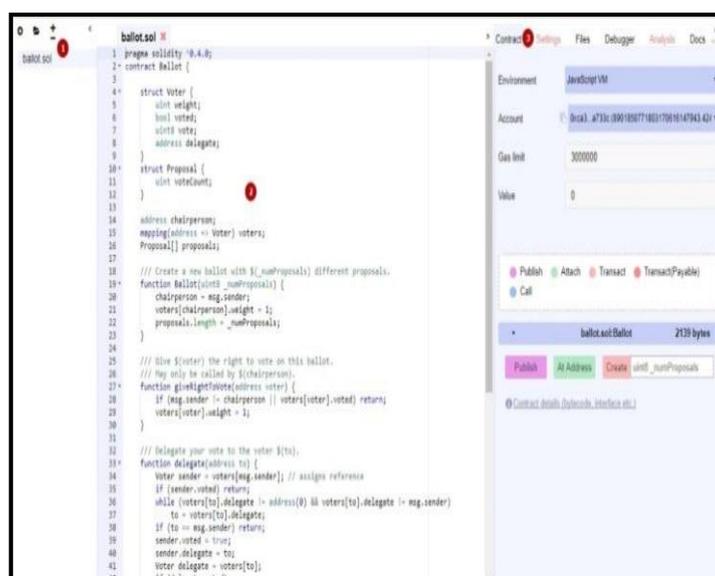


Fig 4 : Remix IDE

#### 4.2.3 TRUFFLE

Truffle is an environment suited for blockchain development. It is a testing framework for blockchains project that uses the Ethereum Virtual Machine (EVM). A truffle package provides us with the following benefits:

Availability of built-in smart contract function, linking, deployment and binary management. Automated contract testing for rapid development and deployment. Management of network for deploying to any number of public & private networks. Management of package with EthPM & NPM, using the ERC190 standard. Interactive console designed for direct contract communication. An External script runner which executes different scripts within a Truffle environment.

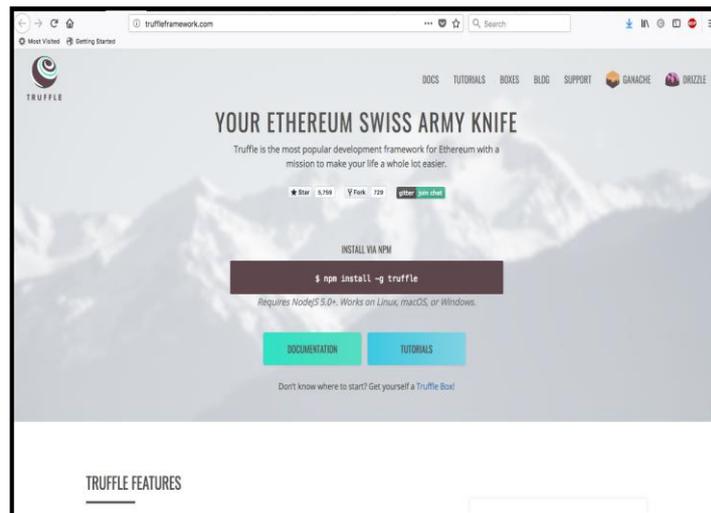


Fig 5: Truffle Framework.

### 5 RESULTS

The following system has been implemented and deployed on the Ethereum RinkeBy test network and the functionalities have been also implemented in the Remix IDE.

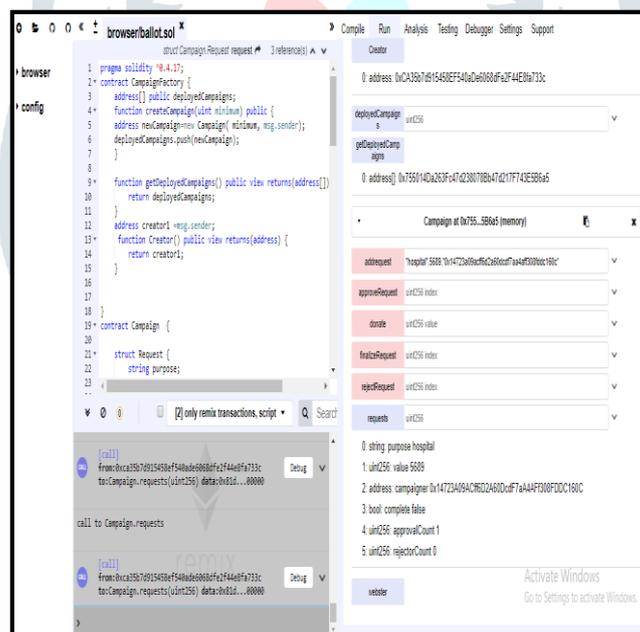


Fig 6: Smart Contract of the campaign deployed on the Remix IDE

Fig 7: Creating a Campaign

Fig 8: Campaign Address

Fig 9: The Contribute Page

## 6. CONCLUSIONS

This decentralized application of crowdfunding through blockchain will have a great impact in prevailing healthy benefits to the campaigner as the funds raised will be collected from the large contingent of small amount of funds. This application will eliminate the need of a third party which will lessen the need to overthink the security of once donated funds. This decentralized application is designed in such a manner, that it focuses on promoting the cause as well as supporting the campaigner to raise the funds unlike other highly estimated crowdfunding platforms whose primacy lies on promoting the brand rather than the cause of the campaigner. Also, this decentralized crowdfunding platform will surely be a subject of redoubtable success in the coming years.

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